Display area position fixing

The present invention relates to a method of displaying information in a data processing system. The invention has been developed for use with a mobile communications handset but may have other applications.

Handsets now allow download of applications, with fixed or variable display sizes. With many different handsets, with different fixed display sizes, it is inevitable that sometimes there will be a mismatch of display size between handset and application. Many techniques exist to view the larger application display through a smaller handset screen for example by the use of a mouse pointer or stylus combined with scroll bars or some other method of movement. Alternatively the application display can be scaled to fit the handset display, with the resultant loss of resolution.

There may be areas of the application display which it is desired to have always visible irrespective of which part of the application display is currently being viewed through the handset display. A mechanism to achieve this is described here.

Prior Art

Split Display

Some word processing applications, such as Microsoft Word and Microsoft Excel, allow the display to be split horizontally into two parts (Excel also allows a vertical split) and then each part is separately scrollable. This technique requires the presence of scroll bars.

Tear-off Menus

Many applications allow part or all of their menu bar to be removed from the top of the screen display and relocated anywhere on the screen. These are known as "tear-off menus".

Multiple Windows

Window-based operating systems allow different windows to occupy separate parts of the screen, either overlapping or non-overlapping. They can also be moved around. However, each window represents a different instance either of the application or the data being presented by the application.

Summary of the invention

The present invention provides a data processing system including an operating system whose functions include operating one or more applications, the operating system including a display subsystem for controlling a visual display, characterised in that.

It is important to note that the display area fixing system is part of the operating system rather than being part of a particular application. Typically, it will operate, in such a way that the instructions from display area fixing system override those derived from an application.

In order to carry out the invention the content of the designated area will be either copied or detached. Either way, it is preferred that the visual content of that area will continue to behave as part of the application. Thus, if it contains "live" information for example, it will continue to be updated.

In contrast to the "split display" described above, scroll bars are not required, thus allowing a greater part of the visible display to be available to display information.

The option to designate a part of a viewed area to remain visible may be provided as part of a menu. The same menu would usually provide the option to un-designate the designated area. The size of the designated area may be defined using a pointing device such as a cursor or stylus. In a particularly simple embodiment of the invention, a rectangular area of any desired size may be designated by the user defining its opposite corners using the pointing device. The designated area remains visible and superimposed on the visible area of the current application, and optionally of any other application that is running, until it is deleted. If the designated area contains changing information, such as the date or time, the displayed values of that information are preferably updated as it continues to be displayed. The designated area may be movable within the display area as a whole, for example to enable viewing of information which it has obscured.

In the context of a display system on a handset where the images presented on the display screen can be moved around by any means, the invention provides a mechanism whereby the user is able to identify and define areas of screen display which then become "fixed" in place on the handset display, preventing those areas from moving except as required by the user and allowing them to always be visible on the screen no matter what movement the rest of the display on the screen may be making. The user may identify each fixed area using a pointing device in combination with one or more keys.

Additionally, where the user has created one or more fixed areas on the screen, these fixed areas can be repositioned as desired using a combination of keys (to

place the handset display in "reposition" mode) and pointer device (to identify the fixed area to be repositioned and its new position).

Finally, where the user has created one or more fixed areas on the screen, any of them can be erased as desired using a combination of keys (to place the handset display in "delete" mode) and pointer device (to identify the fixed area to be deleted).

If a fixed area is part of an application that is running, it will usually be removed if the application is exited or otherwise terminated, possibly by way of a reminder to the user before the application is closed.

To create a fixed area, the user places the handset in "Fixed Area Selection" mode using whatever mechanism is appropriate for the handset. The handset may invite the user to specify one corner of a fixed area. The user then places the cursor of the pointing device at a point on the handset screen to identify one corner of the fixed area. If the pointing device is a mouse, a mouse button may be pressed to select the position. Alternatively, a stylus may be "tapped" on the screen.

Next, the handset may invite the user to specify the opposite corner of the fixed area. The user selects another point on the handset screen as described above. This identifies the opposite corner of the fixed area and causes the display system to leave "Fixed Area Selection" mode and return to the mode it was in before entering "Fixed Area Selection" mode.

The rectangular area of the application display defined by the two points is now designated as a "Fixed Area", and, in the preferred embodiment, can be manipulated according to the following rules.

- No matter what relative movement occurs between the handset display and the application display, the designated "Fixed Areas" such as the one in the example above, remain at a fixed position in the handset display.
- The "Fixed Area" can be moved by placing the cursor of the pointing device inside the fixed area and selecting a unique combination of one or more keys to place the display system in "Fixed Area Relocation" mode. In this mode, moving the cursor of the pointing device also moves the fixed area in the same way, allowing the fixed area to be relocated in the handset display. The fixed area may be partially off the handset display if desired. While in the "Fixed Area Relocation" mode, any existing handset display movement algorithm does not operate. Entering another combination of keys, which may be the same combination that caused the handset to enter this mode, causes the display system to leave "Fixed Area Relocation" mode, and return to the mode it was in before entering "Fixed Area Relocation" mode.
- If multiple fixed areas are designated, they may overlap, in the order in which they are created such that the last to be created overlays all the areas already created. If a previously created fixed area is relocated, it becomes the top visible area.
- Entering yet another combination of one or more keys will cause each overlapping area in turn to overlay all the others.
- An existing "Fixed Area" can be deleted by placing the cursor of the pointing device inside the fixed area and selecting a unique combination of one or more buttons. The fixed area is removed from the display and the system.
- A user option may be provided to enable the user to define the stacking order of multiple overlapping fixed ares.

Alternatively the user, once "Fixed Area Selection" mode is entered, may place the pointer in the desired position for one of the corners of the rectangular area and then drag the pointer to the opposite corner without lifting the pointer.

In another alternative method, the user may trace the outline of the area he wishes to remain fixed on the display using the pointer device or mouse. The area identified in this way is not necessarily square or rectangular. However, it still obeys the rules identified above when manipulated.

Note that the fixed area may behave in the same way as the original area. For example, if the data presented changes in real-time then the data presented in the fixed area also changes. If the fixed area responded to user-initiated cursor or stylus events or to textual input, the fixed area does too.

Embodiments of the invention will now be described by way of example only and with reference to the accompanying drawings in which:

Figure 1 illustrates system/subsystem hierarchy in a data processing system according to the invention;

Figure 2 illustrates an example of an application for which the present invention would be useful;

Figure 3 shows the application of figure 2 in which the invention is applied;

Figure 4 shows the invention being used in a typical "Windows" ™ application; and

Figure 5 shows an example of the display area fixing a system being used to "fix" data from two applications.

Referring to figure 1, a data processing system 1 according to the invention, suitable for use with apparatus having a visual display 2, includes operating system 10 including a display subsystem 11 and display area fixing system 12. A number of applications can be run on the data processing system via the operating system. Two such applications are indicated by numerals 13 and 14. The display subsystem 11 sends instructions to the display 2 whereby to control what is presented on the display 2. The display subsystem 11 may receive instructions from the display area fixing system 12 or from one or more of any applications running, via the operating system. Thus, the display subsystem 11 may receive instructions from the display area fixing system 12 in parallel with instructions from the applications 13,14.

The applications 13,14 and the display area fixing system 12 are in this example all responsive to user input received via the operating system 10 and indicated by arrows UI.

A typical operating system with which the present invention may be used is Microsoft Windows (TM). However, the operating system may be any operating system capable of multitasking.

To illustrate how the display fixing method works, consider the example of a hypothetical mapping application illustrated in figures 2 and 3. This application displays maps of regions of the world to varying scales, and also shows the latitude and longitude of the position of the cursor within the display.

The application has been designed to fit on a larger display than the handset provides, and the panel 18 displaying the latitude and longitude is permanently fixed in the top right-hand corner. The application display area is indicated by the reference numeral 19.

Using a handset display movement algorithm, the part of the application display viewed on the handset display can be moved around using a variety of techniques. When this "viewing window" 20 is moved around, the latitude and longitude panel is no longer in view. Figure 2 illustrates this situation.

In handsets which support the display position fixing technique according to this invention, the latitude and longitude panel can be detached or copied under the control of the display area fixing system 12, and fixed in an appropriate position in the handset display, as shown in figure 3. Here the panel has been copied as indicated by reference 18a. Absent any movement of the panel by the user, the panel will remain in the same position in the handset display, and always be visible as the handset display is moved around.

In this example, the latitude and longitude values presented in the fixed area continue to reflect the values applicable to the current cursor position. Likewise, if the original latitude-longitude panel responded to user-initiated cursor or stylus actions, or allowed the user to enter latitude and longitude values (to select a region to be displayed), the fixed display area in the handset display would also allow these actions to be made and would respond in the same way.

One method by which the user can identify the area to be fixed is as follows.

The user moves the handset display so that the latitude/longitude panel is visible.

The user would enter the handset operating system menu using a key sequence dedicated for that purpose, such as three finger operation, function key or other.

The user scrolls up and down the handset menu, making appropriate selections to reach a configuration menu for setting up a fixed display area.

At this stage a number of techniques are available to identify the latitude/longitude panel. The following are two possibilities:

1. The handset asks the user to identify the upper left corner of the area to be fixed. The user taps the cursor (or a stylus tap) at the top-left corner of the latitude/longitude panel.

   The handset asks the user to identify the lower right corner of the area to be fixed. The user taps the cursor (or a stylus tap) at the lower-right corner of the latitude/longitude panel.

   The handset asks the user to identify where the top-left corner of the panel is to be positioned in the handset display. The user taps a position on the handset display, and a copy of the latitude-longitude panel appears at that position.

2. The handset asks the user to identify the area to be fixed. The user places the cursor (or a stylus tap-and-hold) at the top-left corner of the latitude/longitude panel and drags the cursor to the bottom-right corner.

   The position of the panel is set the same way as the previous technique.

3. A possible extension to this technique would allow the user to identify a non-rectangular shape to be fixed, by dragging the cursor around the outline of the area to be fixed, and then positioning it as desired. If the final position of the cursor is not the same as the starting position, then the two points are joined by a straight line to completely enclose the area to be fixed.

Regardless of the technique used, now when the handset display is moved within the application display, the latitude-longitude panel remains in the same position in the handset display.

The fixed area can be "un-set" by entering the appropriate handset menu and selecting the fixed panel for "un-fixing".

It should be noted that the fixed area can be arranged to respond to user input such as cursor actions in exactly the same way as it would before being "fixed".

In another use of the invention with a mapping application, the user might wish to have the outline of Great Britain, for example, permanently available whilst viewing maps of other parts of the world. The present invention would enable the user to designate an area including a map of Great Britain for permanent display, separately from any such facility that might be part of the mapping application itself. In this context it would be preferable for the visual content of the designated area to be copied, so that Great Britain would still be visible in its usual place as part of Europe. In the example of the designated area displaying latitude/longitude data, it would not be necessary for the visual content of the designated area to be copied.

Figure 4 shows an example of the invention being used with a typical "Windows"™ compatible application such as Microsoft Excel ™. An area 30 being part of a larger spreadsheet 31 is visible on the visual display. In this example, a number of cells indicated by reference 32 have been copied, as shown at 32a so as to be always visible on the screen. Note that this has been achieved through the operating system rather than using the known Excel facility of shading and moving cells. Any of the methods described above may be used to define the area to be copied.

As noted above, the present invention enables more than one area to be "fixed". Figure 5 illustrates an example of this possibility within the context of a Windows (TM) operating system running two applications. The visual display shows two non-overlapping windows relating to the two applications (alternatively these could be part of the same application), indicated as App I and App II. For each window the user has designated respective fixed areas, FA 1 and FA II. All the usual operating system functions are still available for the two windows App I and App II including the ability to alter the window size and "minimise" the windows so that they simply feature as part of a tool bar. Usually the user would be prevented from closing the applications without first "unfixing" the respective designated areas.

It should be noted that the foregoing is to be contrasted with the known facility to simply "shrink" the windows. If the windows are simply shrunk they cannot be operated on in the same way as if certain areas of the windows are "fixed" as shown in Figure 4. According to the invention, the visual content of the designated area is copied or detached leaving the content of the original window or the remainder available as before.

Since the display area fixing system used in the present invention is part of the operating system, it can operate alongside any application without interfering with the normal operation of that application, and is thus particularly useful in gaming applications.